

WHAT IS CLAIMED IS:

1. 1. A method comprising:
  2. providing a DC voltage signal;
  3. utilizing a first switching circuit (104) to switch said DC voltage signal so as to produce relative to a reference voltage a positive pulse width modulated voltage signal for about one half of a fundamental output period;
  6. utilizing a second switching circuit (204) to switch said DC voltage signal so as to produce relative to said reference voltage a negative pulse width modulated voltage signal for about one half of said fundamental output period.
1. 2. The method as described in claim 1 and further comprising:
  2. reversing the polarity of said DC voltage signal after switching said DC voltage signal for about one half of said fundamental output period.
1. 3. The method as described in claim 2 and further comprising utilizing said first switching circuit (104) to reverse the polarity of said DC voltage signal.
1. 4. The method as described in claim 2 and further comprising utilizing said second switching circuit (204) to reverse the polarity of said DC voltage signal.
1. 5. The method as described in claim 1 and further comprising:
  2. utilizing a two switch network (SW11, SW12) as said first switching circuit; electrically coupling said two switch network in parallel with said DC voltage signal;
  5. utilizing a two switch network (SW21, SW22) as said second switching circuit; electrically coupling said two switch network of said second switching circuit in parallel with said DC voltage signal;
  8. configuring an output (108) between said two switch network of said first switching circuit and said two switch network of said second switching circuit.
1. 6. An apparatus comprising:
  2. an input (108) to receive a DC voltage signal;
  3. a first switching circuit (104) configured to modulate said DC voltage signal so as to produce relative to a reference voltage a positive pulse width modulated voltage signal for about one half of a fundamental output period;

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6                   a second switching circuit (204) configured to modulate said DC voltage  
7                   signal so as to produce relative to said reference signal a negative pulse width modulated  
8                   voltage signal for about one half of said fundamental output period.

1               7.       The apparatus as described in claim 6 and further comprising a circuit  
2                   operable to reverse the polarity of said DC voltage signal.

1               8.       The apparatus as described in claim 7 wherein said first switching circuit  
2                   (104) is operable to reverse the polarity of said DC voltage signal.

1               9.       The apparatus as described in claim 7 wherein said second switching  
2                   circuit (204) is operable to reverse the polarity of said DC voltage signal.

1               10.      The apparatus as described in claim 6 wherein said first switching circuit  
2                   comprises a two switch network in parallel with said DC voltage signal and wherein said  
3                   second switching circuit comprises a two switch network in parallel with said DC voltage  
4                   signal; and further comprising an output (108) electrically coupled between said two  
5                   switch network of said first switching circuit and said two switch network of said second  
6                   switching circuit.

1               11.      An apparatus for providing a pulse width modulated voltage signal, said  
2                   apparatus comprising:

3                   an input (107) to receive a DC voltage signal;  
4                   a first switching circuit (104) electrically coupled to said input so as to be  
5                   electrically coupled to said DC voltage signal during operation;  
6                   a second switching circuit (204) electrically coupled to said input so as to be  
7                   electrically coupled to said DC voltage signal during operation;  
8                   wherein said first switching circuit (104) is operable to produce a positive pulse  
9                   width modulated output signal relative to a reference voltage; and

10               wherein said first switching circuit (104) is operable to reverse the polarity  
11               of said DC voltage signal applied to a load during operation.

1               12.      The apparatus as described in claim 11 wherein said second switching  
2                   circuit (204) is operable to produce a negative pulse width modulated output signal  
3                   relative to said reference voltage.

1               13.      The apparatus as described in claim 12 wherein said second switching  
2                   circuit (204) is operable to reverse the polarity of said DC voltage signal.

1               14.      The apparatus as described in claim 11 wherein said first switching circuit  
2                   comprises a first switch and a second switch, said first switch and second switch operable

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3 to reverse said polarity of said DC voltage signal when said first switch is placed in a  
4 conducting state and said second switch is placed in a non-conducting state.

1        15. The apparatus as described in claim 11 wherein said input is electrically  
2        coupled in parallel with said first switching circuit and said second switching circuit.

1           16. A method of providing a pulse width modulated output voltage signal, said  
2 method comprising:

3 providing a DC voltage signal;

4 providing a first switching circuit (104) electrically coupled to said DC voltage  
5 signal;

6 providing a second switching circuit (204) electrically coupled to said DC voltage  
7 signal;

8 operating said first switching circuit (104) to produce a positive pulse width  
9 modulated output signal relative to a reference voltage;

10 operating said first switching circuit to reverse the polarity of said positive  
11 pulse width modulated output signal once during a fundamental output period.

17. The method as described in claim 16 and further comprising:

2 operating said second switching circuit to produce a negative pulse width  
3 modulated output signal relative to said reference voltage.

1 18. The method as described in claim 17 and further comprising:

2 operating said second switching circuit (204) to reverse the polarity of said  
3 output signal.

1           19. The method as described in claim 16 wherein said first switching circuit  
2 (104) comprises a first switch and a second switch, said method further comprising:

3 reversing the polarity of said positive pulse width modulated output signal  
4 by maintaining said first switch in a non-conducting state while maintaining said second  
5 switch in a conducting state.

1 20. The method as described in claim 16 and further comprising:

2                   electrically coupling said DC voltage signal in parallel with said first switching  
3                   circuit; and

4 electrically coupling said DC voltage signal in parallel with said second  
5 switching circuit.

1           21. An apparatus to generate a pulse width modulated voltage signal, said  
2 apparatus comprising:

3           a DC voltage source (102);

4           a first switching circuit (104) comprising a first switch and a second switch  
5 configured in a series circuit, said first switching circuit electrically coupled in parallel  
6 with said DC voltage source;

7           a second switching circuit (204) comprising a third switch and a fourth switch  
8 configured in a series circuit, said second switching circuit electrically coupled in parallel  
9 with said DC voltage source;

10           an output (108) comprising a first electrical junction coupling said first  
11 switch with said second switch and a second electrical junction coupling said third switch  
12 with said fourth switch;

13           said second switching circuit (204) operable to maintain said third switch in a  
14 conducting state while said fourth switch is maintained in a non-conducting state so as to  
15 establish a first polarity of an output signal;

16           said first switching circuit operable to switch said first switch and said second  
17 switch at a modulation frequency;

18           said first switching circuit operable to maintain said second switch in a conducting  
19 state while maintaining said first switch in a non-conducting state so as to establish a  
20 second polarity of said output signal, said second polarity being the reverse polarity of  
21 said first polarity; and

22           said second switching circuit operable to switch said third switch and said  
23 fourth switch at said modulation frequency.

1           22. The apparatus as described in claim 21 wherein said first switching circuit  
2 and said second switching circuit are configured as part of an application specific  
3 integrated circuit.

1           23. The apparatus as described in claim 21 wherein said first switching circuit  
2 (104) is operable to produce a positive pulse width modulated output signal during about  
3 one half cycle of a fundamental output period; and

4           wherein said second switching circuit (204) is operable to produce a  
5 negative pulse width modulated output signal during the other half cycle of said  
6 fundamental output period.

1           24. The apparatus as described in claim 21 and further comprising a motor  
2 electrically coupled to said output.

1           25. The apparatus as described in claim 21 and further comprising a  
2 microprocessor electrically coupled to said first switching circuit and to said second  
3 switching circuit, said microprocessor operable to control said first switching circuit and  
4 said second switching circuit.

1           26. A method of generating a pulse width modulated voltage signal, said  
2 method comprising:

3           providing a DC voltage source (102);  
4           electrically coupling said DC voltage source in parallel with a first switching  
5 circuit (104) comprising a first switch and a second switch configured in a series circuit;  
6           electrically coupling said DC voltage source in parallel with a second switching  
7 circuit (204) comprising a third switch and a fourth switch configured in a series circuit;  
8           establishing an output (108) comprising a first electrical junction coupling said  
9 first switch and said second switch and a second electrical junction coupling said third  
10 switch and said fourth switch;

11           maintaining said third switch in a conducting state while maintaining said  
12 fourth switch in a non-conducting state so as to establish a first polarity of an output  
13 signal;

14           switching said first switch and said second switch at a modulation frequency; then  
15           maintaining said second switch in a conducting state while maintaining said first  
16 switch in a non-conducting state so as to establish a second polarity of said output signal,  
17 said second polarity being the reverse polarity of said first polarity;

18           switching said third switch and said fourth switch at said modulation  
19 frequency.

1           27. The method as described in claim 26 and further comprising:

2           configuring said first switching circuit and said second switching circuit as  
3 part of an application specific integrated circuit.

1           28. The method as described in claim 26 and further comprising:  
2           utilizing said first switching circuit to produce a positive pulse width modulated  
3 output signal during about one half cycle of a fundamental output period; and

4 utilizing said second switching circuit to produce a negative pulse width  
5 modulated output signal during the other half cycle of said fundamental output period.

1           29.    The method as described in claim 26 and further comprising powering a  
2   motor with said output signal.

1                   30.     The method as described in claim 26 and further comprising controlling  
2     said first switching circuit and said second switching circuit with a processor.

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